

I. Amendments

Amendments to the Claims are reflected in the Listing of the Claims,
which begins on page 3 of this paper.

A. Amendments to the Claims

Listing of the Claims

This listing of claims replaces all prior versions and listings of claims in the application:

Please cancel claims 1 through 20 and add new claims 21 through 49 as follows:

1-20 (cancelled)

21. (new) A method for determining a first distance along a movement path on a surface over which an optical tracking device is moved by a user, comprising:

projecting, from a coherent light source, and along the movement path, a beam of coherent light as a first light beam incident on the surface;

generating, on the surface and along the movement path, a plurality of light interference speckles as a result of the first light beam and a second light beam representing at least portions of the first light beam reflected from the surface interfering with one another;

sensing the plurality of speckles with a plurality of light sensors as the optical tracking device is moved along the movement path, and

determining, on the basis of the sensed speckles, the first distance.

22. (new) The method of claim 21, further comprising determining, on the basis of the sensed speckles, a direction in which the optical tracking device moves along the movement path.

23. (new) The method of claim 21, further comprising comparing a plurality of output signals corresponding to at least some of the plurality of sensors to determine the first distance.

24. (new) The method of claim 21, further comprising comparing a plurality of output signals corresponding to at least some of the plurality of sensors to determine a direction in which the optical tracking device moves along the movement path.

25. (new) The method of claim 21, further comprising sensing at least one characteristic of the speckles.

26. (new) The method of claim 25, wherein the at least one characteristic is selected from the group consisting of speckle length, speckle width, speckle dimension, an edge of a speckle, a distance between speckles, a distance between leading edges of speckles, and a distance between trailing edges of speckles.

27. (new) The method of claim 21, further comprising configuring the coherent light source and the plurality of sensors such that dimensions corresponding to the interference pattern speckles may be predicted with a high degree of confidence.

28. (new) The method of claim 21, further comprising configuring the coherent light source and the plurality of sensors such that an average speckle size is given approximately by the equation:

$$\lambda \cdot (R/d),$$

where λ is a wavelength of the light emitted by the coherent light source, R is a second distance the coherent light source is from the surface, and d is a diameter of the coherent light beam.

29. (new) The method of claim 21, further comprising counting the number of speckles along the optical path to determine the first distance.

30. (new) The method of claim 21, wherein the average size of the generated speckles ranges between 50 microns and 100 microns.

31. (new) The method of claim 21, wherein the average size of the generated speckles is approximately 10 microns.

32. (new) The method of claim 21, wherein at least one of a high signal and a low signal is generated in response to at least some of the plurality of sensors detecting a speckle.

33. (new) The method of claim 21, wherein at least one of a high signal and a low signal is generated in response to at least some of the plurality of sensors detecting the absence of a speckle.

34. (new) A device for determining a first distance along a movement path on a surface over which an optical tracking device is moved by a user, comprising:

a coherent light source configured to project a first coherent light beam along the movement path and onto the surface as an incident light beam;

a plurality of light sensors operatively associated with the coherent light source and configured to sense at least a portion of the incident light beam reflected from the surface as a second reflected light beam, and

a processor;

wherein the coherent light source is configured to generate a plurality of light interference speckles on the surface along the movement path as a result of the first light beam and the second light beam interfering with one another, the plurality of light sensors is configured to detect the speckles along the movement path, and the processor is configured to determine the first distance on the basis of the sensed speckles.

35. (new) The device of claim 34, further comprising means for determining, on the basis of the sensed speckles, a direction in which the optical tracking device moves along the movement path.

36. (new) The device of claim 34, further comprising means for comparing a plurality of output signals corresponding to at least some of the plurality of sensors.

37. (new) The device of claim 34, wherein the plurality of sensors further comprise means for sensing at least one characteristic of the speckles.

38. (new) The device of claim 34, wherein the at least one characteristic is selected from the group consisting of speckle length, speckle width, speckle dimensions, an edge of a speckle, distance between speckles, distance between leading edges of speckles, and distance between trailing edges of speckles.

39. (new) The device of claim 34, wherein the coherent light source and the plurality of sensors are configured such that dimensions corresponding to the interference pattern speckles may be predicted with a high degree of confidence.

40. (new) The device of claim 34, wherein the coherent light source and the plurality of sensors are configured such that an average speckle size is given approximately by the equation:

$$\lambda \cdot (R/d),$$

where λ is a wavelength of the light emitted by the coherent light source, R is a second distance the coherent light source is from the surface, and d is a diameter of the coherent light beam.

41. (new) The device of claim 34, wherein the processor is configured to count the number of speckles along the optical path to determine the first distance.

42. (new) The device of claim 34, wherein the average size of the generated speckles ranges between 50 microns and 100 microns.

43. (new) The device of claim 34, wherein the average size of the generated speckles is approximately 10 microns.

44. (new) The device of claim 34, further comprising means for generating at least one of a high signal and a low signal in response to at least one of the plurality of sensors detecting a speckle.

45. (new) The device of claim 34, further comprising means for generating at least one of a high signal and a low signal in response to at least some of the plurality of sensors detecting the absence of a speckle.

46. (new) The device of claim 34, further comprising means for generating at least one of a high signal and a low signal in response to at least some of the plurality of sensors detecting the leading edge of a speckle.

47. (new) The device of claim 34, further comprising means for generating at least one of a high signal and a low signal in response to at least some of the plurality of sensors detecting the trailing edge of a speckle.

48. (new) The device of claim 34, further comprising means for generating at least one of a high signal and a low signal in response to at least some of the plurality of sensors detecting the end of a first speckle and the beginning of a second speckle.

49. (new) The device of claim 34, wherein the device is a mouse.